Space Weather Forecast

Issued on Wednesday, 20 April 2022 at 13:36 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance Strong flares (R3 Radio Blackouts), with further Moderate flares (R1/R2 Radio Blackouts) likely.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been High over the past 24 hours, with a Strong flare observed overnight from a region that had previously rotated off the Earth-facing side of the Sun. This flare occurred sufficiently high above the Sun's surface to be visible by Earth, despite this sunspots location, although there is a chance some of the energy was blocked perhaps suggesting a stronger flare than was observed. This region was the source of most of the Moderate flares seen, despite a large complex of sunspots on the Earth-facing disc. These sunspots were the source of a Strong flare on the 17th, but have generally been less active since, mainly producing common class flares. However, they remain large and sufficiently complex regions for further flares to be possible. There are also four other regions, three following the large sunspot complex in the northeast, and another small region in the south. These four sunspot groups are all simpler and smaller however. No Earth-directed coronal mass ejections (CMEs) have been observed.

Solar Wind / Geomagnetic Activity: The solar wind showed declining coronal hole fast wind characteristics through this period. The solar wind speed has declined slightly from around 450km/s to near 400km/s. The Interplanetary Magnetic Field carried by this wind was weak throughout, with the north-south component also weakly varying. Geomagnetic activity was Quiet to Unsettled (Kp 0-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Moderate over the next four days, with a slight chance of Strong flares, mainly from the large and fairly complex regions currently in the northeast quadrant of the Sun. There is on ongoing likelihood of Moderate flares.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. Solar winds at earth are expected to be mostly Background to slightly elevated, with a slight chance of enhancement later day 1 (20th) or day 2 (21st) from the arrival of the fast wind of a fast wind region, This is low confidence however, as the source coronal hole of this fast wind is no longer visible on the solar disc. Geomagnetic activity is forecast to be mostly Quiet with isolated Unsettled intervals, but with a slight chance of a spell of Unsettled to Active given any fast wind arrival later day 1 or day 2 (20th or 21st).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background with no solar radiation storms occurring. However the risk of solar radiation storms, whilst remaining very low, will increase as the complex sunspot regions move westwards across the disc through the period, and into a greater risk region for effecting the Earth should they produce any particle rich flares.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	Yes	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	7	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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